

AMENDMENT TO THE CLAIMS

1. (Previously Presented) A head suspension comprising:
 - a gimbal portion;
 - a load portion to exert a load force on a head assembly relative to a load point and the gimbal portion supporting the head assembly to roll about a roll axis;
 - a load portion to exert a load force on a head assembly relative to a load point and the gimbal portion supporting the head assembly to roll about a roll axis;
 - and
 - means for controlling roll attitude of the head assembly based upon a radial position of the head assembly in relation to a disc.
2. (Canceled)
3. (Previously Presented) A disc drive comprising:
 - a rotating disc mounted for rotation in the disc drive;
 - a head assembly;
 - a head suspension including a load portion adapted to supply a load force to the head assembly at a load point and a gimbal portion to allow the head assembly to pitch and roll relative to the load point;
 - an actuator coupled to the head suspension to move the head assembly relative to the disc; and
 - means for dynamically controlling a roll attitude of the head assembly.

4. (Cancelled)

5. (Cancelled)

6. (Cancelled)

7. (Previously Presented) A head suspension comprising:

- a load portion to exert a load force on a head assembly relative to a load point;

- a gimbal portion having the head assembly coupled thereto to allow the head assembly to pitch and roll relative to the load point and the gimbal portion including opposed spaced gimbal beams on opposed sides of the load point; and

- a plurality of bending assemblies including a first bending assembly coupled to one of said gimbal beams and a second bending assembly coupled to another of said gimbal beams and the first and second bending assemblies being energizable to adjust pitch and roll attitudes of the head assembly.

8. (Previously Presented) The head suspension as claimed in claim 7, wherein the first bending assembly includes a first bending element energizable via a first electrical interface coupled to the first bending element and the second bending assembly includes a second bending element energizable via a second electrical interface coupled to the second bending element to independently energize the first and second bending elements to adjust the roll attitude of the head assembly.

9. (Previously Amended) The head suspension as claimed in claim 7, wherein:

the first bending assembly includes a first bending element on the one of said gimbal beams and the second bending assembly includes a second bending element on the other of said gimbal beams and the first and second bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion.

10. (Cancelled)

11. (Previously Amended) The head suspension as claimed in claim 7 wherein: the plurality of bending assemblies include a bending element formed of a piezoelectric material.

12. (Previously Amended) The head suspension as claimed in claim 7, wherein:

the first bending assembly includes a first bending element on the one of said gimbal beams and the second bending assembly includes a second bending element on the other of said gimbal beams and the first and second bending elements have an elongated length extending along an elongated length portion of the gimbal beams.

13. (Cancelled)

14. (Previously Amended) The head suspension as claimed in claim 8, wherein the first and second bending elements include opposed

leading and trailing ends and the first and second electrical interfaces include opposed leads coupled proximate to the opposed leading and trailing ends of the first and second bending elements.

15 (Cancelled)

16. (Currently Amended) A head suspension comprising:

- a ~~beam~~suspension portion to exert a load force on a head assembly relative to a load point;
- a gimbal portion having the head assembly coupled thereto to allow a leading edge of the head assembly to pitch about a pitch axis and opposed sides of the head assembly to roll about a roll axis relative to the load point; and

the gimbal portion further including a plurality of bending elements including at least one bending element on a first side of the roll axis and at least one bending element on a second opposed side of the roll axis actuatable to adjust a roll attitude of the head assembly relative to the roll axis.

17. (Previously Presented) The head suspension as claimed in claim 16, wherein:

the plurality of bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion or a piezoelectric material.

18. (Previously Presented) The head suspension as claimed in claim

16, wherein:

the gimbal portion further comprises a pair of longitudinally extending gimbal beams and a connecting cross member between distal ends of the pair of gimbal beams; and

the plurality of bending elements are mounted on the connecting cross member.

19. (Cancelled)

20. (Previously Presented) The head suspension as claimed in claim 16, wherein:

the gimbal portion further comprises a pair of longitudinally extending gimbal beams; and

the plurality of bending elements are mounted on the pair of gimbal beams.

21. (Previously Presented) The head suspension as claimed in claim 16, wherein:

a first electrical interface is coupled to the at least one bending element on the first side of the roll axis and a second electrical interface is coupled to the at least one bending element on the second opposed side of the roll axis to independently energize the first and second bending elements to adjust the roll attitude of the head assembly.

22.-33. (Cancelled)

34. (Previously Presented) The head suspension of claim 1 wherein the means for controlling the roll attitude includes a plurality bending elements on opposed sides of the roll axis.

35. (Previously Presented) The head suspension of claim 34 wherein the plurality of bending elements are formed of a thermally expandable material forming a bi-metal structure having different coefficients of thermal expansion or a piezoelectric material.

36. (Previously Presented) The head suspension of claim 34 wherein the plurality of bending elements are independently energized relative to the radial position of the head assembly in relation to the disc.

37. (Previously Presented) The head suspension of claim 9 wherein the opposed spaced gimbal beams have a different coefficient of thermal expansion than the first and second bending elements to form the bi-metal structure having the different coefficients of thermal expansion.

38. (Previously Presented) The head suspension of claim 7 wherein the first and second bending assemblies are energized based upon a radial position of the head assembly relative to a disc.

39. (Currently Amended) A head assembly comprising
a suspension;
a head coupled to the suspension to roll about a roll axis
defined relative to a load point;
a bending assembly energizable to adjust a roll attitude of

the head relative to the roll axis; and
a controller coupled to the bending assembly and configured
to adjust the roll attitude of the head based upon a
radial position of the head relative to a disc surface
to dynamically control fly attitude based upon the
radial position of the head relative to the disc
surface.

40. (Previously Presented) The head assembly of claim 39 wherein the bending assembly includes a first bending element spaced from the roll axis in a first direction and a second bending element spaced from the roll axis in a second direction opposite to the first direction and the controller is coupled to the first and second bending elements to adjust the roll attitude of the head.

41. (Previously Presented) A method for controlling a roll attitude of a head assembly comprising steps of:

rotating a disc to provide a lifting force to the head assembly; and

energizing a bending assembly to adjust the roll attitude of the head assembly.

42. (Previously Presented) The method of claim 41 wherein the step of energizing further comprises energizing a plurality of bending elements to adjust the roll attitude of the head assembly.

43. (Previously Presented) The method of claim 41 including a first bending element on a first side of a roll axis and a second

bending element on a second opposed side of the roll axis and the step of energizing the bending assembly energizes one of the first or second bending elements.

44. (Previously Presented) The method of claim 41 including a first bending element on a first side of a roll axis and a second bending element on a second opposed side of the roll axis and the step of energizing the bending assembly energizes the first and second bending elements.

45. (Previously Presented) The method of claim 44 wherein the first bending element is energized to bias the head assembly in a first direction and the second bending element is energized to bias the head assembly in a second direction opposite to the first direction to adjust the roll attitude of the head assembly.